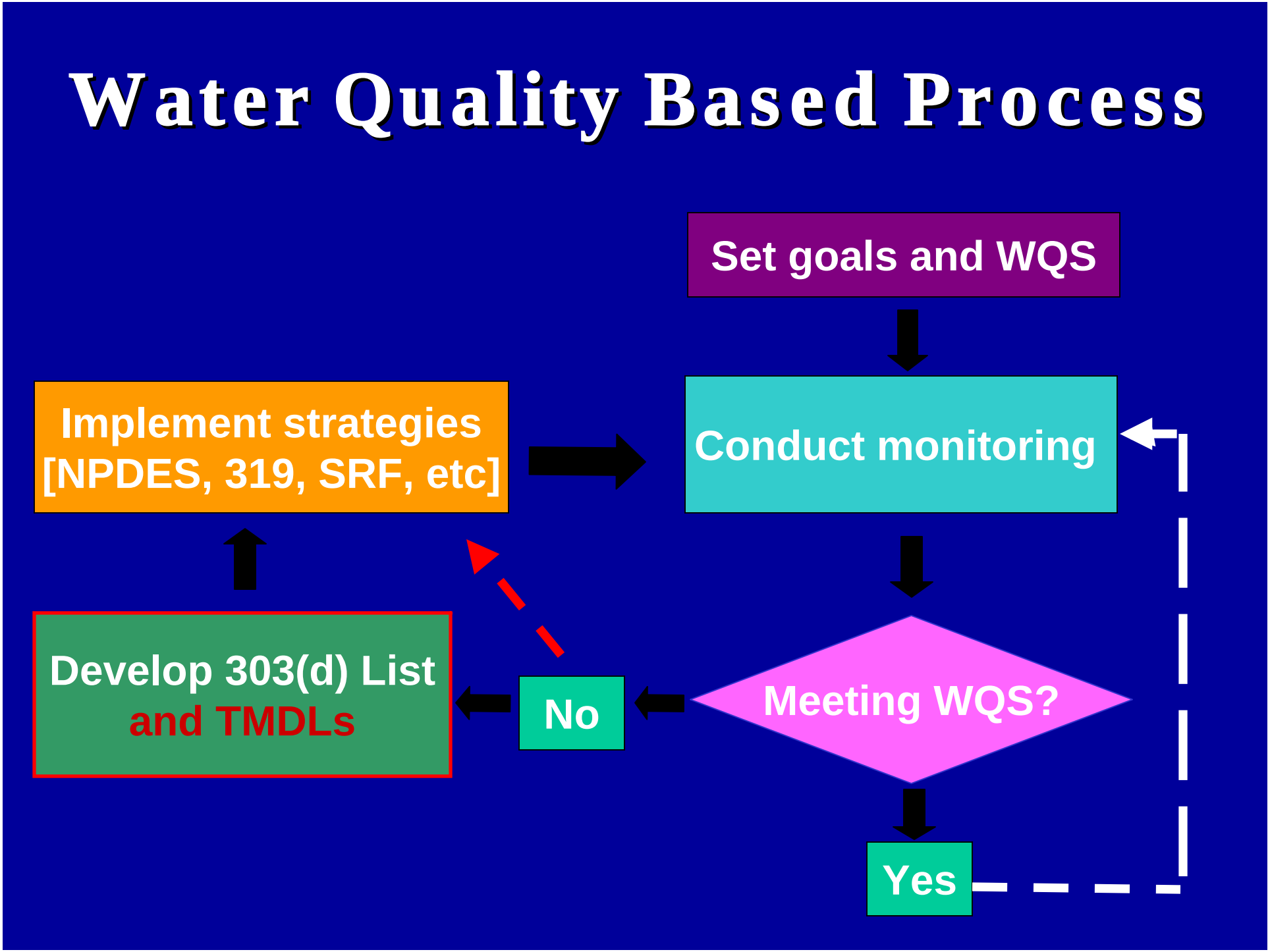
MISSOURI'S TOTAL MAXIMUM DAILY LOAD PROGRAM

Missouri Department
of Natural Resources

Water Quality Based Process



Water Quality Protection Strategies

- Permitting
- Watershed Management Plans
- Grants/Loans
- Enforcement
- Education and Outreach
- Voluntary Water Quality Monitoring
- Development of Appropriate Standards

TMDL Universe

based on 2002 303(d) List

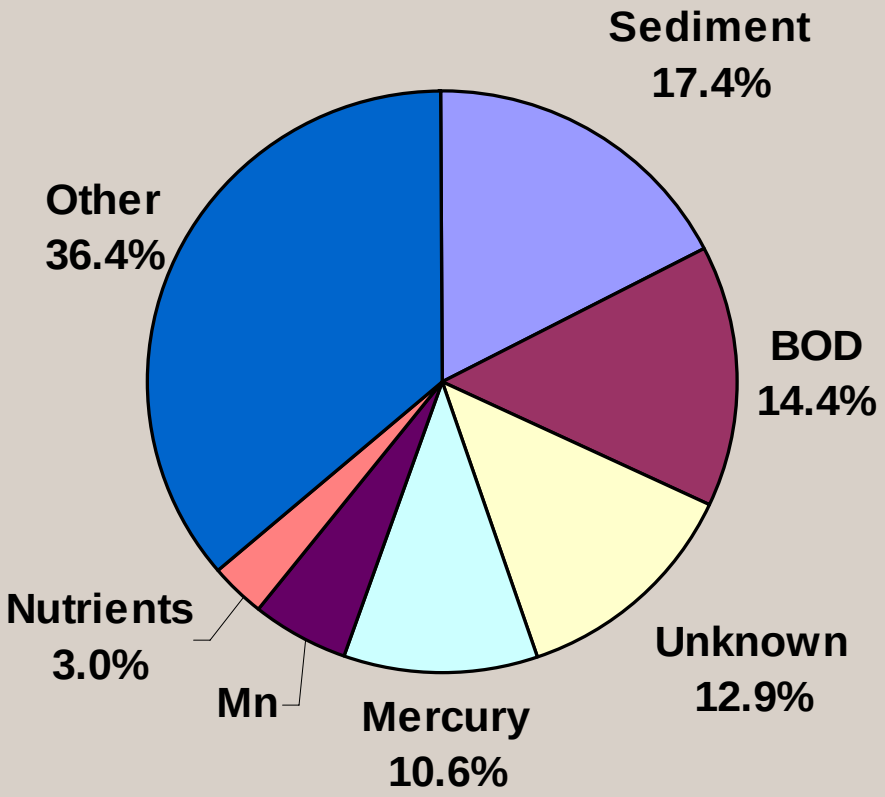
38 Lakes	89,210 acres
132 streams	2959.1 miles

TMDL Schedule

per MOA with EPA

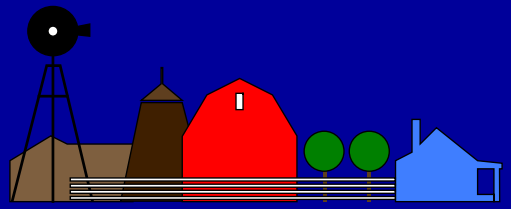
Calendar Year	TMDLs Required per Year
2000	13
2001	9
2002	6
2003	34
2004	21
2005	39
2006	12

Pollutants Targeted for TMDLs



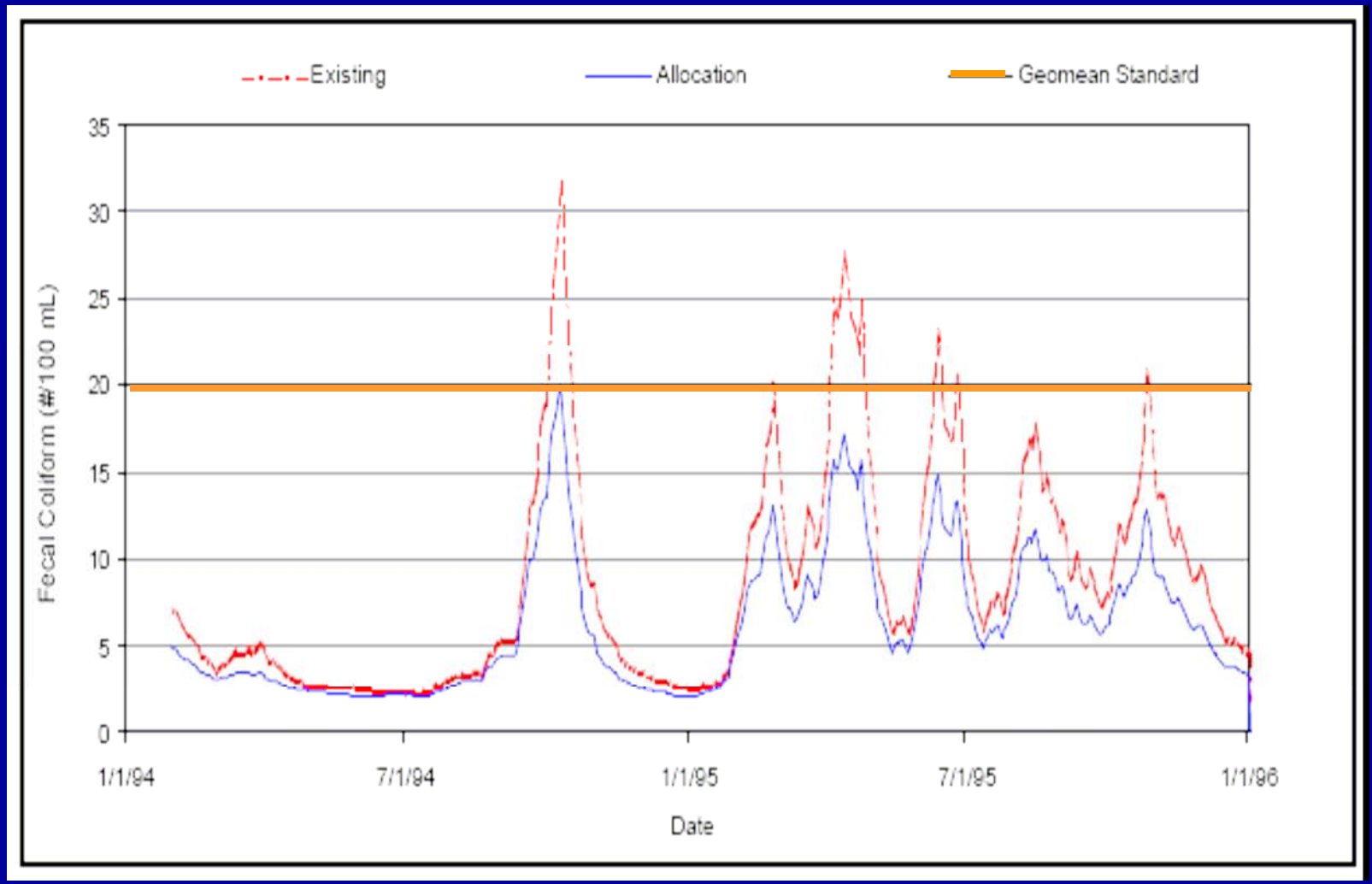
Required Elements in TMDLs

- Identify Sources of Pollutant
- Calculate Maximum Pollutant Load
- Assign Pollutant Allocations to Point Sources and Nonpoint Sources
- Address “Seasonality”
- Include “Margin of Safety” to Account for Uncertainty



Key Factors in a TMDL

Source(s) PS / NPS	Pollutant / Condition WQS / Use Impairment
Criterion Numeric / General	Target Load WLA + LA
Margin of Safety Explicit / Implicit	TMDL WLA + LA +MOS


Existing
Allocation
Geomean Standard
Fecal Coliform (#/100 mL)
35
30
25
20
15
10
5
0
1/1/94
7/1/94
1/1/95
7/1/95
1/1/96
Date

Allocation Formula

$$LC = (Qs + Qd) * WQC * CF$$

(0.1 cfs)(2 mg/L)(5.40) = 1.1 pounds per day

TMDL Scenario 1

Source(s)	Pollutant / Condition
NPS - Abandoned Mine Land	Sulfates + Chlorides @ 2000 mg/L AQL Use Impairment
Water Quality Criterion	**Target Load**
1000 mg/L	1000 mg/L
Margin of Safety	**TMDL**
Explicit - 10 % of LC 100 mg/L	900 mg/L (900 x Flow x CF = #/day)

TMDL Scenario 2

Source(s)	Pollutant / Condition
NPS - Ag Runoff	Taste and Odor in Drinking Water Total P = 0.05 mg/L at source
Water Quality Criterion Narrative - "Free from…"	Target Load 50% of current load of Total Phosphorus or amount needed to achieve ≤ 0.025 mg/L TP
Margin of Safety Explicit - 20 % of LC 0.005 mg/L	TMDL (LA + MOS) 0.020 mg/L TP (0.020 x flow x CF = #/day)

TMDL Scenario 3

Source(s)	Pollutant / Condition
PS - Industrial - 1.0 mgd	Fish Advisory - PAH
Water Quality Criterion	**Target Load**
Narrative - "Free from…"	11 mg/L (borrowed the WQS)
Margin of Safety	**TMDL (WLA + MOS)**
Explicit - 10 % of LC 1.1 mg/L	9.9 mg/L (9.9 x flow x CF = #/day)

TMDL Scenario 4

Source(s)	Pollutant / Condition
NPS + PS (POTW)	Bacteria Recreation Use Impairment
Water Quality Criterion	**Target Load**
548 col / 100 mL	274 + 274 = 548
Margin of Safety	**TMDL (WLA + LA + MOS)**
Explicit ~ 10 % of LC 58 col / 100 mL	245 * (Qd + Runoff) = counts per day

Implicit Margin of Safety

- Conservative factors used in modeling approach (Reasonable Worst-Case Scenario)

Load Allocation and Standards

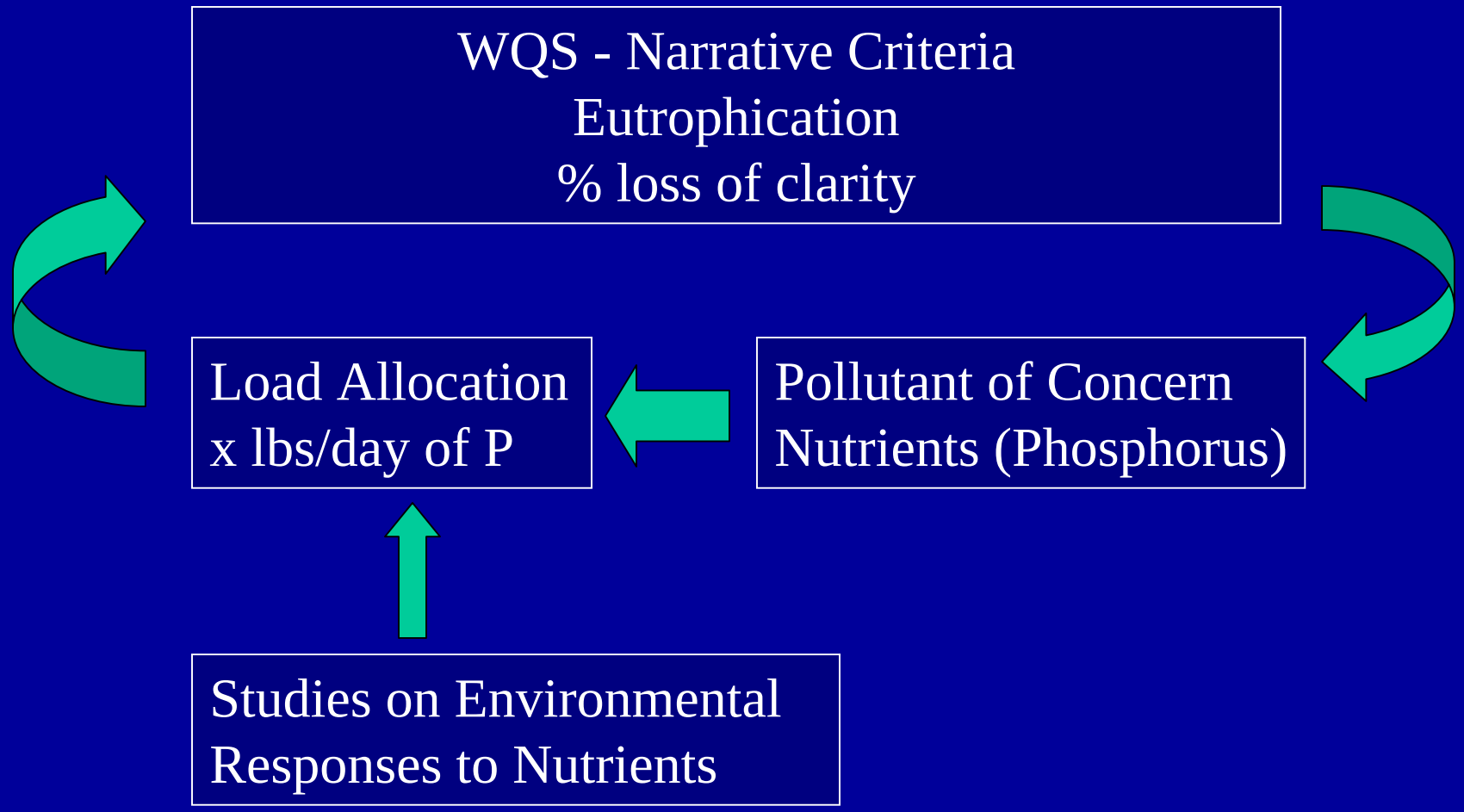
- Waters listed as impaired from sediment, turbidity, nutrients or discoloration (for which numeric criteria have not been developed) require translators to connect the load allocation to the water's impairment

Addressing Narrative Criteria

Matching the Load Allocation to the WQ Standard

- **Eutrophication**
  - Chl-a (ug/L) linked to P or N (mg/L)
- **Turbidity**
  - Secchi Disk Depth (m) linked to TSS (mg/L)
- **Sediments**
  - Bottom Coverage (%) linked to TSS (mg/L)
- **Discoloration**
  - Color Match (amt. of color disparity using the Platinum Cobalt Visual Method) linked to Chem “X”

Matching Loads to Standards



In Lieu of TMDLs…

- Impairment is caused only by point source(s)
- Pollutant(s) identified
- Permit(s) issued based on waste load allocation
- Effluent limits in a permit are addressing the impairment

TMDL Prohibition

- 644.036.5 RSMo - “Total maximum daily loads shall not be required for any listed waters that subsequently are determined to meet water quality standards”

Monitoring and TMDLs

- Monitoring is sometimes necessary to collect water quality data for developing a TMDL
- Special Studies are conducted to facilitate the development of some TMDLs

Public Participation with TMDLs

- Discussions during TMDL development
- All draft TMDLs are posted on Web and distributed from mailing list
- Comment period is at least 30 days
- Public meetings if appropriate
- May republish TMDLs with major revisions following comments

On the Internet...

Department of Natural Resources 2006 TMDL Development Schedule
(Click on a heading below to sort the table.)

WBID	**Water Body**	**Pollutant**	**Target Date for Public Notice**	**Target Date to Submit to EPA**	**Comments**
3413	Horseshoe Creek, Jackson County	BOD, NH3N	2005/01/28	2006/02/23	Permit in Lieu of TMDL Submitted to EPA 2006/02/23 Oak Grove WWTP - MO0130371 New permit issued 2006/02/10
1339	**Walnut Creek**, Cedar County	BOD, VSS	2005/12/09	2006/04/05	Permit in lieu of TMDL. Approved on 2006/05/26 El Dorado Springs WWTF - MO0040002 Issued 2006/03/24

dnr.mo.gov/env/wpp/tmdl/index.html